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Femoral Head Osteotomy in an Indian Ringneck Parakeet

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Abstract

A six year old, male Indian Ringneck parakeet was presented to Brisbane Bird and Exotics Veterinary Service with a suspected dislocation of the right coxofemoral joint. The bird also had a broken nail and a skin wound on the right leg so therefore trauma was suspected, though not witnessed by the owner. The bird was initially stabilised and then radiographs taken under general anaesthesia confirmed the coxofemoral dislocation. A femoral head osteotomy (FHO) was performed and post-surgery abduction of the leg was corrected and the bird was able to grip weakly. Over the two weeks post-surgery the bird regained normal posture and almost normal grip strength in the affected leg. This case shows that femoral head osteotomy is a viable treatment option for coxofemoral dislocations.

Introduction

Coxofemoral luxation can occur in wild and captive birds, most commonly due to trauma. In captive birds this most commonly occurs when a bird becomes trapped in the cage bars or cage furnishings and struggles free. Restraint is another possible cause (Bennett, 2013). Craniodorsal luxations are most common (Harrison and Lightfoot, 2006; Doneley, 2016), though cranioventral luxations have been reported (Bennett, 2013). Diagnosis is generally based on history, clinical signs and radiography (Doneley, 2016). There are a variety of treatment options, including femoral head osteotomy.

Case Report

A six year old, male Indian Ringneck parakeet (*Psittacula krameri*) was presented to Brisbane Bird and Exotics Veterinary Service as the owner had found the bird in the cage with blood on the right leg. The bird was not trapped in any part of the cage or cage furnishings at the time. On presentation, the right leg was abducted and the bird was not able to grip the perch with this leg. A physical examination revealed a fractured area of keratin on the nail of digit 1 on the right foot, a skin wound over the lateral stifle which extended to the caudolateral aspect of the distal right thigh and a palpably unstable coxofemoral joint. At this stage, coxofemoral luxation and a proximal femoral fracture were differential diagnoses for the instability of the coxofemoral joint.

The bird was admitted into hospital and stabilisation treatment was instituted. This included the bird being placed into a heated cage, the temperature being between twenty eight and thirty degrees Celsius. Butorphanol (Butorgesic injection, Troy Laboratories Pty Ltd) was given at 2mg/kg intramuscularly and this was repeated between eight to twelve hourly intervals. Subcutaneous physiological saline solution was administered at a rate of twice maintenance (100mL/kg/day) initially, spread across a twenty four hour period. An oral course of amoxicillin/clavulanic acid (Augmentin, Aspen Australia) was commenced, administered at 125mg/kg every twelve hours. The wound was gently cleaned with chlorhexidine, flushed with saline solution and then covered with a sterile dressing (Tricotex, Smith and Nephew) (Melolin, Smith and Nephew) (Co-Plus, BSN Medical) (Leukoplast, BSN Medical).

The following day general anaesthesia was induced with isoflurane and oxygen via a facemask. An endotracheal tube was placed and the anaesthetic maintained via isoflurane and oxygen. A ventrodorsal and a right lateral radiograph of the whole bird were taken and the bird recovered from anaesthesia uneventfully. The radiographs confirmed a craniodorsal luxation of the right coxofemoral joint. No other abnormalities were found.

Treatment options, including attempting open surgical reduction and stabilisation, femoral head osteotomy (FHO), limb amputation and euthanasia were

outlined to the owner, who had expressed cost constraints. After a discussion of the options the owner elected to go ahead with a femoral head osteotomy procedure.

The following day the bird was again induced into general anaesthesia in the same fashion. This time a ventilator and warmed anaesthetic gases (Darvall Heated ZDS Qube) were used. An intravenous catheter was placed into the left ulnar vein (Vena cutanea ulnaris superficialis) and saline solution was administered at 10mL/kg/hr throughout the procedure. Monitoring equipment included a Doppler on the right wing to monitor cardiac sounds, capnography, internal and external temperature probes and a nurse periodically using a stethoscope to monitor cardiac and lung sounds. The patient was positioned on a Bair Hugger (3M, Australia).

The bird was positioned in left lateral recumbancy and the right leg and right caudal dorsum plucked. The skin in this area and the existing skin wound were surgically prepared with chlorhexidine. The surgical area was draped in a sterile fashion and the existing wound on the caudolateral aspect of the leg was explored. It was found to be a linear skin wound measuring approximately 4cm in length. No deeper tissue was involved. The area was debrided and then flushed. A splash block of part of a solution made from 2mg/kg of lignocaine (Lignomav 20mg/mL, MavLab Australia) and 2mg/kg of bupivacaine (Bupivacaine Injection BP 0.5%, Pfizer Australia) was instilled into the wound to assist in analgesia and then the skin was sutured in a simple continuous pattern.

A sharp, linear skin incision was then made from the dorsolateral crest of the ilium to just distal to the femoral trochanter. The muscle bundles covering the coxofemoral joint on the lateral aspect of the leg (iliotibialis lateralis and iliofibularis muscles) were separated from each other and their common tendinous insertion onto the ilium was transected. This then exposed the iliofemoralis externus and the iliotrochantericus caudalis muscles which are dorsal to the acetabulum. They were also transected, ensuring enough tissue was left to reattach them.

The coxofemoral joint was visualised and an incision into the joint was not required given the tissue was already torn (refer to Figure 1). The femoral head and neck was removed by cutting the proximal femoral neck with scissors. Care was taken to avoid the femoral artery and vein, which are medial to this area. Rongeurs were then used to remove any remaining, sharp fragments of bone. A splash block of the remaining local anaesthetic solution was applied to the bone end and surrounding tissue. The joint capsule was unable to be visualised for closure. The transected muscles were repaired and the skin was closed in a routine fashion. The leg palpated normally at this stage and no excessive external rotation was present.

The bird recovered from general anaesthesia and the intravenous catheter was removed. Minimal bleeding occurred during surgery. The leg was left without a bandage and immediately after surgery was placing the leg on the perch in a normal anatomical position (prior to surgery the limb was abducted). Early use of the limb was encouraged to assist in the formation of a pseudoarthrosis. Butorphanol was continued for 24 hours after surgery. The bird was discharged with oral amoxicillin/clavulanic acid and meloxicam. Two weeks post surgery the bird was perching normally and able to climb. The grip strength was only slightly reduced compared to the left leg. The leg was held in a normal position. Gentle palpation revealed that the coxofemoral joint was stable.

Discussion

The avian coxofemoral joint is synovial and supported by a round ligament at the head of the femur as well as collateral ligaments (Olsen and Orosz, 2000; Bennett, 2013). In most psittacine birds and raptors it is not a typical ball and socket joint, instead having significant caudal gliding motion with little abduction and adduction (Bennett, 2013). When craniodorsal luxation occurs, the round ligament and ventral collateral ligament are disrupted ((Olsen and Orosz, 2000; Bennett, 2013). Due to the gliding anatomy, and also the powerful contractive force of the leg muscles, conservative management is frequently unsuccessful (Doneley, 2016). If attempted, closed reduction and cage rest should only be performed in small birds (Harrison and Lightfoot, 2006).

The treatment of choice for acute coxofemoral luxations, particularly in larger birds, is open surgical reduction and stabilisation, though it is not always successful (Ritchie and Harrison, 1994; Olsen and Orosz, 2000; Bennett, 2013). The luxation is reduced surgically and the joint capsule is sutured in two or three locations (Doneley, 2016). Stabilising sutures are then placed (described below) (Bennett, 2013; Doneley, 2016). An open reduction needs to be performed as soon as possible as significant periarticular fibrosis can occur from three days after the luxa-

tion. Also, while the bird tries to use the leg, damage occurs to the articular cartilage which can lead to degenerative joint disease in future (Bennett, 2013). Orthopaedic pins should not be used to fix the femoral head into the acetabulum due to the high risk of damaging the kidney and its blood supply, which is medial to the pelvis. In addition, the acetabulum is fibrous, apart from the rim, and does not provide good purchase for pins (Harrison and Lightfoot, 2006).

Open surgical reduction and stabilisation requires more post-operative care than a FHO. The leg needs to be supported in a Spica splint for seven to ten days (Bennett, 2013; Doneley, 2016). Radiographs need to be taken post surgery and after each bandaging as re-luxation is common (Bennett, 2013). The bird will need to be housed in an enclosure with smooth walls and a low perch to prevent climbing for three weeks (Harrison and Lightfoot, 2006; Bennett, 2013).

A femoral head osteotomy an alternative procedure to open reduction and also is indicated in cases of chronic luxations (Olsen and Orosz, 2000; Bennett, 2013), femoral head fractures or where an avulsion fracture of the femoral head is present (Harcourt-Brown and Chitty, 2005). This surgery is associated with a good prognosis (Harcourt-Brown and Chitty, 2005). Passive range of motion exercises can also be instituted the day after surgery to assist in rehabilitation (Bennett, 2013). Early use of the limb is encouraged to assist in the formation of a fibrous pseudoarthrosis (Bennett, 2013).

The most convenient surgical approach to the joint is craniolateral for both open surgical reduction and FHO procedures, as it allows for access to the joint capsule and placement of supporting sutures (Bennett, 2013). However, in most cases the joint capsule is torn or absent due to the bird attempting to walk on the damaged leg (Bennett, 2013).

There may be excessive external rotation of the limb following femoral head osteotomy, particularly in birds with a gliding coxofemoral joint. This is due to damage to the muscles that normally prevent external rotation occurring during the initial trauma (Bennett, 2013). Supporting sutures can be placed during surgery to prevent this. These sutures are also placed during an open reduction procedure to stabilise the joint. Polydioxanone sutures should be used (Bennett, 2013) and the sutures are placed through the bone while the stifle is maintained in a normal standing position. One suture is placed from the femoral trochanter to the dorsolateral iliac crest and the other from the trochanter to the cranial rim of the acetabulum (Bennett, 2013; Doneley, 2016). Some species of birds, for example ratites, have a ball and socket style joint and for these birds supporting sutures are not appropriate after open reduction (Ritchie and Harrison, 1994).

A study in mute swans (*Cygnus olor*) showed that computed tomography (CT) is more sensitive for diagnosing coxofemoral luxations and concurrent avulsion fractures of the femoral head than radiography (Gumpenberger and Scope, 2012). This is significant because open reduction is less likely to be successful if concurrent avulsion fractures of the femoral head are present. CT should be considered as a diagnostic tool prior to open reduction surgery.

Conclusion

Femoral head osteotomy is a valid treatment option for pet birds diagnosed with coxofemoral luxation. Rehabilitation after surgery is easier and quicker compared with open joint reduction and the prognosis is generally good, even for larger birds.

Acknowledgements

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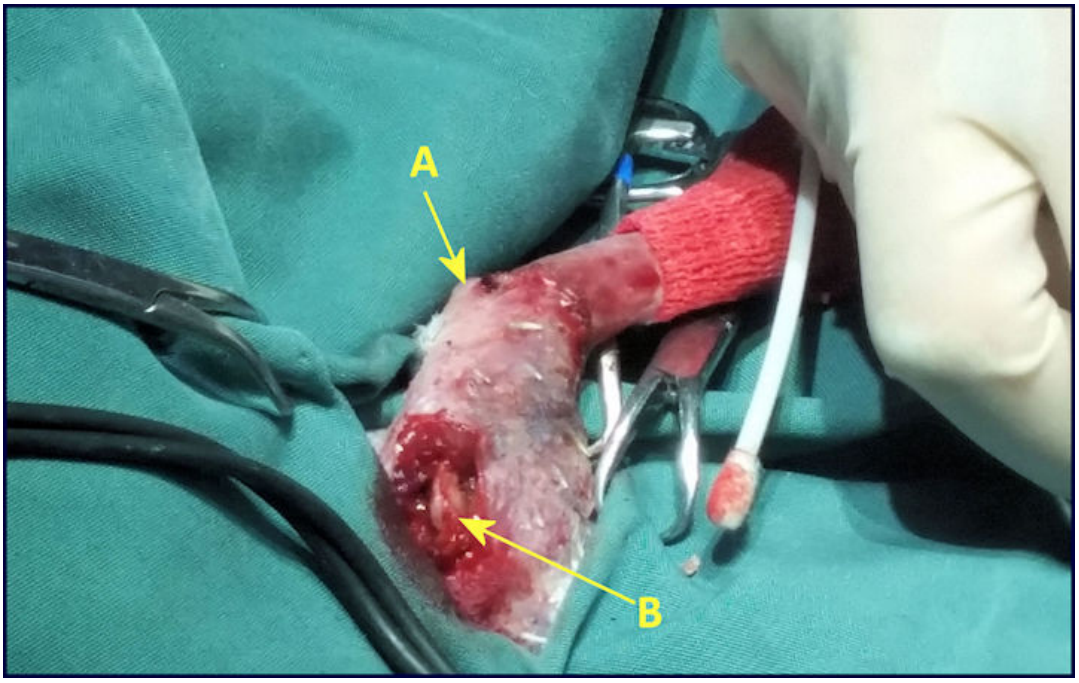

Figure 1. Visualisation of the femoral head during surgery. A - Stifle;
B - Craniolateral surgical approach to the coxofemoral joint with the exposed femoral head